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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,104	01/13/2004	Daryl E. Anderson	200314645	2920
22879 7590 03/24/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400				
EXAMINER BODDIE, WILLIAM				
ART UNIT		PAPER NUMBER		
2629				
NOTIFICATION DATE		DELIVERY MODE		
03/24/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/757,104

Applicant(s)

ANDERSON ET AL.

Examiner

WILLIAM L. BODDIE

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-21, 23-54 and 63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-21, 23-54 and 63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. In an amendment dated, December 26th, 2007, the Applicant amended claim 25. Currently claims 1-8, 10-21, 23-54 and 63 are pending.

Response to Arguments

2. Applicant's arguments filed December 26th, 2007 have been fully considered but they are not persuasive.
3. On pages 16-17 of the Remarks, the Applicants traverse the drawing objection stating that figure 1 was never admitted prior art. As evidence the Applicants point to the initial brief description of the figure which calls figure 1, "an exemplary embodiment."

This single phrase is not seen as sufficiently persuasive to rule out that the figure is indeed still admitted prior art. The full description of figure 1 is more enlightening as to the Applicants stance towards figure 1. While the full description of figure 1 is located under the detailed description heading of the specification this is also does not preclude a finding that figure 1 is still admitted prior art.

In the view of the Examiner, the most telling description of figure 1 occurs in paragraph 23 of the specification which states in part, "[w]hile DLDs such as that illustrated in Figure 1 have been traditionally been used to produce a desired image, an undesirable color shift may occur as the temperature of the DLD varies during operation." Most importantly in this sentence is a description of figure 1 as an embodiment that has **traditionally been used**. Furthermore the manner in which the specification is ordered and flows, figure 1 is held up as an example which exhibits

problems with temperature variations. It is in the subsequent figures that the Applicants work to overcome this problem that was presented in prior art embodiments.

Thus for the above reasons, figure 1 is seen as admitted prior art and is required to be labeled as such.

4. On pages 17-18, the Applicants again argue that figure 1 is not admitted prior art. As shown above figure 1 is still seen as admitted prior art.

5. On pages 19-20, the Applicants argue that Romo does not disclose thermally coupling a temperature sensor to a flexure supporting a pixel plate of a DLD, outputting a thermal measurement of the flexure, or a circuit to apply the temperature compensated voltage.

It is important to note that the rejection of claim 1 was performed under a 103 rejection with a combination of Applicants admitted prior art figure 1 and the disclosure of Romo. Applicants' arguments seem to be attacking Romo as if it were the only art applied in the rejection.

The Examiner agrees that Romo does not disclose a DLD device or a flexure supporting a pixel plate of a DLD. What is argued is that one of ordinary skill in the art at the time of the invention when presented with Romo and figure 1 would be motivated to combine the two references to generate a DLD which satisfies all of the limitations of claim 1. Furthermore while Romo is not a DLD, Romo's invention is directed to a MEMS device with flexures which are controlled by electrostatic attraction and vulnerable to temperature variations just as figure 1 is. To repeat, the rejection is not that Romo satisfies all of the limitations of claim 1, rather the combination of figure 1

with Romo would satisfy claims 1, 12, 24 and 31. For the above reasons, the combination of figure 1 and Romo is seen as sufficient and the rejection of claims 1, 12, 24 and 31 are thus maintained.

6. On pages 23-25, the Applicants traverse the rejections of claims 23, 5-8, 14-16, 18-21, 25-26, 28-29, 32-33, 35-38, 56 and 63 on the grounds that McCartney is not analogous art.

The Examiner must respectfully disagree. As cited in the previous office action McCartney, Romo and figure are analogous art because they are all driving devices for multi-layer display devices that are temperature dependent. While a LCD does function differently than a DLD, this would not affect the manner in which temperature compensated voltages are generated. It is for this voltage generation circuitry that McCartney is included and nothing specific to DLDs.

7. On pages 25-26, the Applicants traverse the rejections of claims 10-11, 23, 30 and 39 on previous addressed arguments and further argue that none of the prior art disclose measuring average temperature of flexures in an array of DLDs as stated in claim 11.

The Examiner must respectfully disagree. Mori discloses measuring average temperature in column 6, lines 30-45. As discussed in the rejection, APA when combined with Romo and Mori disclose all the limitations surrounding claim 11. Therefore the rejection of claims 10-11, 23, 30 and 39 are seen as sufficient and are thus maintained.

8. On pages 26-27, the Applicants argue that Naiki does not disclose a low pass filter electrically coupled to a buffer amplifier and a scaler/offset amplifier electrically coupled to the low pass filter.

The Examiner must respectfully disagree. As stated in the previous office action, Naiki discloses a buffer amplifier (OP2 in fig. 4) a scaler (14-15 in fig. 8) and a low pass filter (13 in fig. 8) that is electrically connected to both. While element 13 is labeled as an averaging circuit in figure 8, Naiki's discussion of the circuit in column 11 lines 46-49 disclose that the circuit is actually performing low pass filter functionality.

Pages 28-29 restate arguments which have already been addressed. As shown above the rejections presented previously are seen as sufficient and are thus maintained.

Specification

9. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: claims 50-54 currently recite a processor readable medium. There is no discussion within the specification as to the scope of the term, processor readable medium.

Drawings

10. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 12-13, 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereinafter APA) in view of Romo et al. (US 7,197,225).

With respect to claim 1, APA discloses, a diffractive light device (DLD) (fig. 1) comprising:

a substrate (150 in fig. 1);

a force plate (140 in fig. 1) disposed on said substrate, said force plate configured to produce an electrostatic force in response to an applied voltage (para. 19 of the original specification);

a pixel plate (110 in fig. 1) supported by a flexure (120 in fig. 1) adjacent to said force plate (clear from fig. 1), wherein a position of said pixel plate is controlled by said electrostatic force and by said flexure (para. 19) coupled to said pixel plate to display a pixel of an image (para. 22); and

a circuit (170, 180 in fig. 1) that generates and applies a voltage to said force plate (para. 21).

APA does not expressly disclose a temperature sensor or compensating the applied voltage based on thermal measurements produced by a temperature sensor.

Romo discloses, a temperature sensor (708 in fig. 12) thermally coupled to an a flexing cantilever (fig. 3, for example), without affecting movement of said cantilever, and outputting a thermal measurement indicative of a temperature of said flexing cantilever, wherein said temperature sensor is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor (col. 9, line 66 – col. 10, line 4).

APA and Romo are analogous art because they are both from the same field of endeavor namely optical MEMS devices operating using electrostatic attraction.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor and compensation means of Romo in the DLD device of APA.

The motivation for doing so would have been to overcome temperature dependent instabilities (Romo; col. 1, lines 46-48).

With respect to claim 12, the only difference between claim 12 and claim 1 is the device is a MEMS device instead of a DLD device. As APA is clearly a MEMS device claim 12 is rejected on the same merits shown above in the rejection of claim 1.

With respect to claim 13, APA and Romo disclose, a MEMS of claim 12 (see above).

APA further discloses, a support post (130 in fig. 1) extruding from said substrate; and

a flexure (120 in fig. 1) coupling said pixel plate (110 in fig. 1) to said support post (130 in fig. 1), wherein said flexure is configured to exert a spring force on said pixel plate opposing said electrostatic force (para. 19).

APA does not expressly disclose, that the thermal effect comprises a change in spring force exerted by a flexure on a pixel plate.

Romo discloses, that a thermal effect comprises a change in the actuation force necessary to affect a change in the cantilever (col. 1, lines 46-48; col. 4, lines 23-27; col. 10, lines 1-4).

At the time of the invention it would have been obvious to one of ordinary skill in the art to also compensate the DLD of APA for a change in spring force as taught by Romo.

The motivation for doing so would have been to overcome temperature dependent instabilities (Romo; col. 1, lines 46-48).

With respect to claim 24, APA discloses, an image display device comprising:

a system controller (180 in fig. 1);

a variable voltage source communicatively coupled to said system controller (170 in fig. 1); and

an array of DLDs (160 in fig. 1) communicatively coupled to said variable voltage source, each DLD of said DLD array (para. 3) including a substrate (150 in fig. 1),

a force plate disposed on said substrate (140 in fig. 1), said force plate configured to produce an electrostatic force in response to a voltage applied by said voltage source (para. 19),

a pixel plate disposed adjacent to said force plate (110 in fig. 1), wherein a position of said pixel plate is determined by said electrostatic force and a flexure coupled to said pixel plate (para. 19).

APA does not expressly disclose a temperature sensor or compensating the applied voltage based on temperature measurements produced by a temperature sensor.

Romo discloses, a temperature sensor (708 in fig. 12) thermally coupled to an a flexing cantilever (fig. 3, for example), without affecting movement of said flexure, and outputting a temperature measurement indicative of a temperature of said flexing cantilever, wherein said temperature sensor is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor (col. 9, line 66 – col. 10, line 4).

APA and Romo are analogous art because they are both from the same field of endeavor namely optical MEMS devices operating using electrostatic attraction.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor and compensation means of Romo in the DLD device of APA.

The motivation for doing so would have been to overcome temperature dependent instabilities (Romo; col. 1, lines 46-48).

With respect to claim 31, the only difference in scope between claim 31 and claim 1, is the replacement of force plate, pixel plate and temperature with “means for” language. As shown above in the rejection of claim 1, the means provided by Hung, and Romo are seen as sufficiently equivalent to the Applicant’s disclosed structure to satisfy the “means for” language of claim 31. For this reason, claim 31 is rejected on the same merits shown above in claim 1.

13. Claims 2-3, 5-8, 14-16, 18-21, 25-26, 28-29, 32-33, 35-38 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant’s Admitted Prior Art (hereinafter APA) in view of Romo et al. (US 7,197,225) and further in view of McCartney et al. (US 5,088,806).

With respect to claim 2, APA and Romo disclose, the DLD of claim 1 (see above).

Neither APA nor Romo expressly disclose, an offset voltage generator to generate a temperature compensated voltage.

McCartney discloses, a temperature sensor (52 in fig. 5) thermally coupled to a display device (50 in fig. 5), wherein said temperature sensor is configured to produce a temperature compensated voltage in response to a thermal measurement performed by said temperature sensor (col. 4, lines 18-30), further comprising;

an offset voltage generator (54-56 in fig. 5), wherein said offset voltage generator is configured to generate a temperature compensated offset voltage based on said thermal measurement (col. 3, lines 12-24); and

a summing element for adding said offset voltage to a reference voltage to produce a temperature compensated voltage (col. 4, lines 34-44).

APA, Romo and McCartney are analogous art because they are both from the same field of endeavor namely, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor circuitry, taught by McCartney on the diffractive light device of APA and Romo.

The motivation for doing so would have been to provide a more accurate and reliable displayed image (McCartney; col. 2, lines 22-43).

With respect to claim 3, APA, McCartney and Romo disclose, the DLD of claim 2 (see above).

Neither APA nor McCartney expressly disclose, that the thermal effect comprises a change in spring force exerted by a flexure on a pixel plate.

Romo discloses, that a thermal effect comprises a change in the actuation force necessary to affect a change in the cantilever (col. 1, lines 46-48; col. 4, lines 23-27; col. 10, lines 1-4).

Romo, APA and McCartney are analogous art because they are both from the same field of endeavor namely, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to also compensate the DLD of APA and McCartney for a change in spring force as taught by Romo.

The motivation for doing so would have been to overcome temperature dependent instabilities (Romo; col. 1, lines 46-48).

With respect to claim 5, APA, Romo and McCartney disclose, the DLD of claim 2 (see above).

McCartney further discloses, wherein said offset voltage generator comprises:
a signal digitizer (54 in fig. 5) configured to digitize said thermal measurement;
a system controller (55 in fig. 5) communicatively coupled to said signal digitizer;
and

a data storage device (55 in fig. 5) communicatively coupled to said system controller, wherein said data storage device contains a plurality of offset voltage value associated with said digitized thermal measurement (col. 3, lines 18-24).

With respect to claim 6, APA, Romo and McCartney disclose, the DLD of claim 2 (see above).

McCartney further discloses, wherein said offset voltage generator comprises:
a signal digitizer (54 in fig. 5) configured to digitize said thermal measurement;
a system controller (55 in fig. 5) communicatively coupled to said digitizer, said system controller configured to combine said digitized thermal measurement to a uncompensated digital color count (command word in fig. 5); and

a digital to analog converter (56 in fig. 5) communicatively coupled to said system controller, wherein said digital to analog converter is configured to convert said combined digital signal into a thermally compensated analog voltage.

With respect to claim 7, APA, Romo and McCartney disclose, the DLD of claim 2 (see above).

Neither APA nor Romo expressly disclose a variable voltage source communicatively coupled to said offset voltage generator.

McCartney further discloses, a variable voltage source (56-57 in fig. 5) communicatively coupled to said offset voltage generator, wherein said variable voltage source is configured to generate a temperature compensated offset voltage in response to a command signal received from said offset voltage generator (col. 4, lines 27-30).

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the variable voltage circuitry, taught by McCartney on the diffractive light device of APA and Romo.

The motivation for doing so would have been to provide a more accurate and reliable displayed image (McCartney; col. 2, lines 22-43).

With respect to claim 8, APA, Romo and McCartney disclose, the DLD of claim 2 (see above).

McCartney further discloses, wherein said summing element comprises a summing circuit, wherein said summing circuit is configured to combine said temperature compensated offset voltage with each of a plurality color specific voltages (col. 4, lines 34-44) to produce a temperature compensated voltage corresponding to

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each of a plurality of colors produced by pixel element of said DLD (col. 2, lines 41-43; col. 4, lines 42-44).

With respect to claims 14-16 and 18-21, these claims are seen as sufficiently equivalent to claims 2-3 and 5-8 to be rejected on the same merits shown above in the rejection of claims 2-3 and 5-8.

With respect to claims 25-26 and 28-29, these claims are seen as sufficiently equivalent to claims 2-3 and 5-8 to be rejected on the same merits shown above in the rejection of claims 2-3 and 5-8.

With respect to claims 32-33 and 35-37, these claims are seen as sufficiently equivalent to claims 2-3 and 5-8 to be rejected on the same merits shown above in the rejection of claims 2-3 and 5-8.

With respect to claim 38, APA, Romo and McCartney disclose, the DLD of claim 37 (see above).

McCartney further discloses, wherein said color voltage bias comprises a non-compensated voltage bias (co. 4, lines 30-33).

With respect to claim 63, APA and Romo disclose the MEMS of claim 12 (see above).

APA further discloses, an array of corresponding pixel and force plates (para. 23).

Neither APA nor Romo expressly disclose an offset voltage generator.

McCartney discloses, an offset voltage generator (54-56 in fig. 5), that applies an offset voltage based on said temperature measurement (col. 3, lines 12-24) to a global LCD bias signal used by the LCD electrodes.

APA, when combined with Romo and McCartney discloses, an offset voltage generator (McCartney; 54-56 in fig. 5), that applies an offset voltage based on said temperature measurement (McCartney; col. 3, lines 12-24) to a global MEMS bias signal used by the force plates.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor circuitry, taught by McCartney on the diffractive light device of APA and Romo.

The motivation for doing so would have been to provide a more accurate and reliable displayed image (McCartney; col. 2, lines 22-43).

14. Claims 10-11, 23, 30 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereinafter APA) in view of Romo et al. (US 7,197,225) and further in view of Mori et al. (US 5,903,251).

With respect to claim 10, APA and Romo disclose, the DLD of claim 1 (see above).

Neither APA nor Romo expressly disclose, that the temperature sensor comprises a thermal sense resistor or a diode bandgap.

Mori discloses, a temperature sensor (5 in fig. 1), comprising a thermal sense resistor (thermistor; col. 4, line 18), thermally coupled to a display device (6 in fig. 1), wherein said temperature sensor is configured to produce a temperature compensated

voltage in response to a thermal measurement performed by said temperature sensor (col. 4, lines 30-37).

APA, Romo and Mori are analogous art because they are both from the same field of endeavor namely, compensating electro-optical devices.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor circuitry, taught by Mori on the diffractive light device of APA and Romo.

The motivation for doing so would have been to provide a more accurate and reliable displayed image even when temperature distribution is present in the display panel (Mori; col. 2, lines 35-38).

With respect to claim 11, APA, Romo and Mori disclose, the DLD of claim 10 (see above).

APA, when modified as taught by Romo and Mori, further discloses wherein said temperature sensor is configured to measure an average temperature of flexures in an array of DLDs (Mori; col. 6, lines 30-45).

With respect to claims 23, 30 and 39, these claims are seen as sufficiently equivalent to claims 10-11 to be rejected on the same merits shown above in the rejection of claims 10-11.

15. Claims 4, 17, 27 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereinafter APA) in view of Romo et al. (US 7,197,225) and McCartney et al. (US 5,088,806) and further in view of Naiki et al. (US 7,038,654).

With respect to claim 4, APA, Romo and McCartney disclose, the DLD of claim 2 (see above).

Neither Hung, Romo nor McCartney disclose, the inner circuitry of the offset voltage generator.

Naiki discloses, wherein an offset voltage generator comprises:

- a buffer amplifier (OP2 in fig. 4; fig. 4 is a view of the temperature sensor circuit);
- a low pass filter (13 in fig. 8) electrically coupled to said buffer amplifier (col. 11, lines 46-49); and
- a scaler (14-15 in fig. 8) electrically coupled to said low pass filter (clear from fig. 8 that all the components are electrically coupled).

Naiki, Romo, APA and McCartney are analogous art because they are all from the same field of endeavor namely, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the offset voltage circuitry taught by Naiki in the display device of APA, Romo and McCartney.

The motivation for doing so would have been a more accurate temperature sensor with only a negligible measurement error (Naiki; col. 2, lines 1-4).

With respect to claims 17, 27 and 34, APA, Romo and McCartney disclose, the DLD/MEMS of claims 16, 26 and 32 (see above).

These claims are seen as sufficiently equivalent to claim 4 to be rejected on the same merits shown above in the rejection of claim 4.

16. Claims 40, 42, 44-46, 49-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCartney et al. (US 5,088,806) in view of Applicant's Admitted Prior Art (hereinafter APA).

With respect to claim 40, McCartney discloses, a method of compensating for thermal effects in a LCD comprising:

measuring a temperature of said LCD (col. 4, lines 18-19);
generating a temperature compensated offset voltage (col. 4, lines 21-27)
associated with an effect said temperature will have on said LCD (slow response time; col. 4, lines 9-15); and

producing a temperature compensated voltage on said LCD using said temperature compensated offset voltage, wherein applying said temperature compensated voltage to said LCD compensates for said thermal effects (col. 4, lines 27-30).

McCartney does not expressly disclose, compensating thermal effects in a DLD.

APA discloses a diffractive light device, which is affected by thermal effects (fig. 1).

APA and McCartney are analogous art because they are both directed to the same problem solving area, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the LCD of McCartney with the DLD of APA for the well-known benefit of the increased contrast possible with DLD devices.

With respect to claim 42, APA and McCartney disclose, the method of claim 40 (see above).

McCartney further discloses, wherein said generating a temperature compensated offset voltage comprises:

providing said signal to an offset voltage generator (54-56 in fig. 5), wherein said offset voltage generator is configured to generate a temperature compensated offset voltage based on said signal (col. 3, lines 12-24).

With respect to claim 44, APA and McCartney disclose, the method of claim 42 (see above).

McCartney further discloses, wherein said offset voltage generator comprises:
a signal digitizer (54 in fig. 5) configured to digitize said thermal measurement;
a system controller (55 in fig. 5) communicatively coupled to said signal digitizer;
and

a data storage device (55 in fig. 5) communicatively coupled to said system controller, wherein said data storage device contains a plurality of offset voltage value associated with said digitized thermal measurement (col. 3, lines 18-24).

With respect to claim 45, APA and McCartney disclose, the method of claim 42 (see above).

McCartney further discloses, wherein said offset voltage generator comprises:
a signal digitizer (54 in fig. 5) configured to digitize said thermal measurement;
a system controller (55 in fig. 5) communicatively coupled to said digitizer, said system controller configured to combine said digitized thermal measurement to a uncompensated digital color count (command word in fig. 5); and
a digital to analog converter (56 in fig. 5) communicatively coupled to said system controller, wherein said digital to analog converter is configured to convert said combined digital signal into a thermally compensated analog voltage.

With respect to claim 46, APA and McCartney disclose, the method of claim 40 (see above).

McCartney further discloses, wherein said measuring a temperature of said DLD comprises:
thermally coupling a thermal sensor (52 in fig. 3) to a LCD (clear from fig. 5 that the temp sensor is coupled to the LCD); and
sensing a temperature of said LCD (clearly the temperature sensor, senses the temperature of the LC D).

With respect to claim 49, APA and McCartney disclose, the method of claim 40 (see above).

McCartney further discloses, a summing circuit, wherein said summing circuit is configured to combine said temperature compensated offset voltage with a color voltage bias (col. 4, lines 34-44) to produce said temperature compensated voltage.

With respect to claim 50, McCartney discloses, a processor readable medium (55 in fig. 5) having instructions thereon that are executable by a processor for:

sensing a temperature change of a LCD (col. 4, lines 18-20); and
modifying a voltage provided to said LCD in response to said sensed temperature change (col. 4, lines 21-33).

McCartney does not expressly disclose, sensing temperature changes specifically in a DLD.

APA discloses a diffractive light device, which is affected by thermal effects (fig. 1).

APA and McCartney are analogous art because they are both directed to the same problem solving area, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the LCD of McCartney with the DLD of APA for the well-known benefit of the increased contrast possible with DLD devices.

With respect to claim 51, APA and McCartney disclose, the processor readable medium of claim 50 (see above).

McCartney further discloses, wherein said modifying a voltage provided to said DLD comprises:

receiving a signal associated with said sensed temperature change (output of 54 in fig. 5); and

generating a temperature compensated offset voltage based on said signal (col. 4, lines 27-30).

With respect to claim 52, McCartney and APA disclose, the processor readable medium of claim 51 (see above).

McCartney further discloses, wherein said processor readable medium further has instructions thereon that are executable by a processor for:

digitizing said signal (54 in fig. 5);

providing said digitized signal to a data storage device (55 in fig. 5); and

receiving a temperature compensated offset voltage value from said data storage device (col. 3, lines 18-24).

With respect to claim 53, McCartney and APA disclose, the processor readable medium of claim 52 (see above).

McCartney further discloses, wherein said data storage device comprises a data lookup table (col. 4, lines 23-27).

With respect to claim 54, McCartney and APA disclose, the processor readable medium of claim 51 (see above).

McCartney further discloses, wherein said processor readable medium further has instructions thereon that are executable by a processor for:

digitizing said signal (54 in fig. 5);

combining said digitized signal with a digital color count (command word in fig. 5); and

converting said combined signal to an analog voltage (56 in fig. 5).

17. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCartney et al. (US 5,088,806) in view of Applicant's Admitted Prior Art (hereinafter APA) and further in view of Romo et al. (US 7,197,225).

With respect to claim 41, McCartney and APA disclose, the method of claim 40 (see above).

Neither APA nor McCartney expressly disclose, that the thermal effect comprises a change in spring force exerted by a flexure on a pixel plate.

Romo discloses, that a thermal effect comprises a change in the actuation force necessary to affect a change in the cantilever (col. 1, lines 46-48; col. 4, lines 23-27; col. 10, lines 1-4).

Romo, APA and McCartney are analogous art because they are both from the same field of endeavor namely, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to also compensate the DLD of APA and McCartney for a change in spring force as taught by Romo.

The motivation for doing so would have been to overcome temperature dependent instabilities (Romo; col. 1, lines 46-48).

18. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCartney et al. (US 5,088,806) in view of Applicant's Admitted Prior Art (hereinafter APA) and further in view of Naiki et al. (US 7,038,654).

With respect to claim 43, McCartney and APA disclose, the method of claim 42 (see above).

Neither APA nor McCartney disclose, a low pass filter.

Naiki discloses, wherein an offset voltage generator comprises:

a buffer amplifier (OP2 in fig. 4; fig. 4 is a view of the temperature sensor circuit);

a low pass filter (13 in fig. 10) electrically coupled to said buffer amplifier (col. 11, lines 46-49); and

a scaler (14-15 in fig. 8) electrically coupled to said low pass filter (clear from fig. 8 that all the components are electrically coupled).

Naiki, APA and McCartney are analogous art because they are all from the same field of endeavor namely, driving devices for multi-layer display devices that are temperature dependent.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the offset voltage circuitry taught by Naiki in the display device of APA and McCartney.

The motivation for doing so would have been a more accurate temperature sensor with only a negligible measurement error (Naiki; col. 2, lines 1-4).

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19. Claims 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCartney et al. (US 5,088,806) in view of Applicant's Admitted Prior Art (hereinafter APA) and further in view of Mori et al. (US 5,903,251).

With respect to claim 47, APA and McCartney disclose, the method of claim 46 (see above).

Neither APA nor McCartney expressly disclose what type of temperature sensor is used.

Mori further discloses, wherein said temperature sensor comprises a thermal sense resistor (thermistor; col. 4, line 18).

APA, McCartney and Mori are analogous art because they are both from the same field of endeavor namely, driving devices for multi-layer display devices.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor circuitry, taught by Mori on the diffractive light device of APA and McCartney.

The motivation for doing so would have been to provide a more accurate and reliable displayed image even when temperature distribution is present in the display panel (Mori; col. 2, lines 35-38).

With respect to claim 48, APA and McCartney disclose, the method of claim 47 (see above).

Neither APA nor McCartney expressly disclose measuring an average temperature of an array of DLDs.

Mori further discloses, wherein said temperature sensor is configured to measure an average temperature of an array of pixels (col. 6, lines 30-45).

At the time of the invention it would have been obvious to one of ordinary skill in the art to include the temperature sensor circuitry, taught by Mori on the diffractive light device of APA and McCartney.

The motivation for doing so would have been to provide a more accurate and reliable displayed image even when temperature distribution is present in the display panel (Mori; col. 2, lines 35-38).

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM L. BODDIE whose telephone number is

(571)272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sumati Lefkowitz/
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Unit 2629

/Wlb/
3/4/08